

wherein one of the surface insulating films [has a smaller thickness than the other insulating films and is the insulating film which] is formed on the interior surface of said at least one trench in the second portion and is capable of functioning as an electric fuse.--

--3. (Twice Amended) The semiconductor device according to claim [1] 2, wherein:

the plurality of surface insulating films are gate oxide films; and
the plurality of conductive films are gate electrodes.--

REMARKS

Applicants submit that by the present Amendment and Remarks, this Application is placed in clear condition for immediate allowance. At the least, the present Amendment reduces the number of issues, as by obviating the drawing objection and rejections under 35 U.S.C. §112, thereby placing this Application in better condition for Appeal. Accordingly, entry of the present Amendment and Remarks, and favorable consideration, are respectfully solicited pursuant to 37 C.F.R. §1.116.

Claims 1 through 4, 6 and 7 are pending in this Application. Claims 2 and 3 have been amended. Care has been exercised to avoid the introduction of new matter. Indeed, adequate descriptive support for the present Amendment should be apparent throughout the originally filed disclosure. The amendment to claim 2 merely omits language identified by the Examiner as objectionable and lacking descriptive support. The

amended into claim 3 is formalistic in nature. Applicants submit that the present Amendment does not generate any new matter issue or any new issue for that matter.

A clean copy of amended claims 2 and 3 appears in the Appendix hereto.

In the third enumerated paragraph on page 2 of the June 5, 2002 Office Action, the Examiner objected to the drawings pursuant to C.F.R. §1.83(a), asserting the differential thickness limitation of claim 3 does not appear on the drawings.

This objection is traversed. Specifically, the language identified by the Examiner as to the smaller thickness insulating film has been deleted, thereby overcoming the stated basis for the objection.

Accordingly, withdrawal of the drawing objection is solicited.

Claim 2 was rejected under the first paragraph of 35 U.S.C. §112 for lack of adequate descriptive support.

In the statement of the rejection, the Examiner asserted that the specification does not contain support for a plurality of surface insulating films having different thicknesses, wherein the smaller thickness film is formed on the interior surfaces of at least one trench. This rejection is traversed.

Claim 2 has been amended by deleting the requirement for a plurality of surface insulating films having different thicknesses and the requirement for a thin insulating film to be formed on an interior surface of the trench, thereby overcoming the states bases for the imposed rejection. Applicants submit that one having ordinary skill in the art would have recognized from the originally filed disclosure that Applicants had possession of the

now claimed invention. *Union Oil Co. of California v. Atlantic Richfield Co.* ___ F.3d ___, 54 USPQ2d 1227 (Fed. Cir. 2000); *In re Anderson*, 471 F.2d 1237, 176 USPQ 331 (CCPA 1973).

Applicants, therefore, submit that the imposed rejection of claim 2 under the first paragraph of 35 U.S.C. §112 for lack of adequate descriptive support is not viable and, hence, solicit withdrawal thereof.

Claims 1 and 3 were rejected under the second paragraph of 35 U.S.C. §112.

In the statement of the rejection, the Examiner asserted that the scope of claim 1 is not clear, particularly as to the function of the surface insulating film in the first portion. The Examiner also perceived a lack of antecedent basis in claim 3. This rejection is traversed.

Indefiniteness under the second paragraph of 35 U.S.C. §112 is a **question of law**, not form. *Personalized Media Communications LLC v. U.S. International Trade Commission*, 161 F.3d 696, 48 USPQ2d 1880 (Fed. Cir. 1998); *Tillotson, Ltd v. Wlaboro Corp.*, 831 F.2d 1033, 4 USPQ2d 1450 (Fed. Cir. 1987); *Orthokinetics Inc. v. Safety Travel Chairs Inc.*, 806 F.2d 1565, 1 USPQ2d 1081 (Fed. Cir. 1986). Accordingly, in rejecting a claim under the second paragraph of 35 U.S.C. §112, the Examiner must provide a basis and fact and/or cogent technical reasoning to support the ultimate legal conclusion that one having ordinary skill in the art, with the supporting specification in hand, would not be able to reasonably ascertain the scope of protection defined by a claim. *In re Okuzawa*, 537 F.2d 545, 190 USPQ 464 (CCPA 1976). Significantly, consistent judicial precedents holds that reasonable precision in light of the particular

subject matter involved is all that is required by the second paragraph of 35 U.S.C. §112. *Zoltek Corp. v. United States, supra*; *Miles Laboratories, Inc. v. Shandon, Inc.*, 997 F.2d 870, 27 USPQ2d 1123 (Fed. Cir. 1993); *North American Vaccine, Inc., v. American Cyanamid Co.*, 7 F.3d 1571, 28 USPA2d 1333 (Fed. Cir. 1993); *U.S. v. Teletronics Inc., supra*; *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 231USPQ (Fed. Cir. 1986). Applicants stress that claims must be interpreted as one having ordinary skill in the art would have interpreted the claims in light of and consistent with the supporting specification. *Zoltek Corp. v. United States, supra*; *Miles Laboratories, Inc. v. Shandon, Inc. supra*.

In applying the above legal tenets to the exigencies of the case, Applicants submit that the Examiner did not discharge the initial burden of establishing a prima facie basis to deny patentability to the claimed invention under the second paragraph of 35 U.S.C. §112. Indeed, it should be apparent from the second disclosed embodiment commencing at page 5 of the written description of the specification, line 14, that it is in section (C) that the fused portion is formed. Applicants note that in section (B) a transfer gate is formed. ←

Applicants would further note that one having ordinary skill in the art would have appreciated the problem addressed and solved by the claimed invention, as identified in the ultimate full paragraph on page 1 of the written description of the specification, i.e., damage to a circuit located in proximity to a target position for a fuse. The present invention addresses and solves that problem, consistent with the drive toward further miniaturization, by forming a very thin insulating fuse layer in a trench isolation.

As to claim 3, Applicants would initially assert that a mere perceived lack of antecedent basis does not automatically trigger a rejection under the second paragraph of 35 U.S.C. §112. *Bose Corp. v. JBL, Inc.* ___F3d___, 61 USPQ2d, 1216 (Fed. Cir. 2001).

See, also, MPEP §2173.05(e).

At any rate, claim 3 has been amended so that the insulating films coincide with the "surface" insulating film of claim 2 upon which claim 3 is now dependent.

Applicants, therefore, submit that the imposed rejection of claims 1 and 3 under the second paragraph 35 U.S.C. §112 is not viable and, hence, solicit withdrawal thereof.

Claims 1, 4 and 6 were rejected under 35 U.S.C. §103 for obviousness predicated upon Chen.

In the statement of the rejection, the Examiner concluded that one having ordinary skill in the art would have been motivated to modify Chen's semiconductor device by providing a plurality of active devices and a plurality of isolation regions. As to claim 4, the Examiner asserted that the surface insulating film must be inherently thin enough to function as an electric fuse. This rejection is traversed as factually and legally erroneous.

➡ Independent claim 1 is directed to a semiconductor device comprising, *inter alia*, a first portion having a plurality of active regions and a **plurality of isolation regions** separating the active regions from each other. A surface insulating film formed on a surface of the active regions in the first portion is **also formed on the interior surface of at least one trench in the second portion and** is sufficiently thin to function as a fuse. It is **not** apparent and the Examiner has **not** complied with judicial standards by pointing

to "page and line" wherein Chen discloses **any isolation trenches** to begin with. *In re Rijckaert*, 9 F.3d 1531, 28 USPQ2d 1955 (Fed. Cir. 1993). The trench disclosed by Chen, apparently is seized upon by the Examiner, is not an isolation trench but a protection cell for antifuses. The protection cell ruptures not because of any thickness in any layer, but because the edges of the antifuse bottom electrode are exposed forming a sharp corner of the electrode and a deep aspect ratio, thereby degrading antifuse performance for the protection cell resulting in a reduced breakdown voltage and increased leakage current. See, for example, column 2 of Chen, lines 24 through 36.

Applicants would note that the Examiner's secondary reference to Nguyen clearly **distinguishes** between antifuses on the one hand and fuses on the other hand, and clearly teaching away from fuses. Note, for example, column 1 of Nguyen, lines 33 through 65.

It should, therefore, be apparent that Chen neither discloses or suggests a semiconductor device comprising a plurality of isolation regions to begin with, let alone a plurality of isolation regions with trenches, wherein a surface insulating film extends therein and is sufficiently thin to function as a fuse. Indeed, Chen does not even disclose a fuse.

Moreover, any notion that any surface insulating film disclosed by Chen is sufficiently thin to function as a fuse is pure speculation and without any factual basis.

Applicants would stress that inherency requires **certainty**, not speculation. *Finnegan Corp. v. ITC*, 180 F.3d 1354, 51 USPQ2d 1001 (Fed. Cir. 1999); *In re Robertson*, 169 F.3d 743, 49 USPQ2d 1949 (Fed. Cir. 1999). Moreover, as held by the Honorable Board of Patent Appeals and Interferences in *Ex parte Schriker*, 56 USPQ2d 1723, 1725 (BPAI 2000):

However, when an examiner relies on inherency, it is incumbent on the Examiner to point to the "page and line" of the prior art which justifies an inherency theory.

No such basis has been identified by the Examiner.

→ As to claim 4, Applicants would again stress that Chen neither discloses nor suggests a semiconductor device as claimed wherein a surface insulating film extends along a surface of the trench and is sufficiently thin to function as a fuse. Chen neither discloses nor suggests a fuse to begin with. Ergo, there is absolutely no basis upon which to predicate the determination that any insulating film disclosed by Chen is sufficiently thin to function as a fuse. Inherency, as previously pointed out, requires **certainty**, not speculation. *Finnegan Corp. v. ITC, supra; In re Robertson, supra; Ex parte Schriker, supra.*

Applicants, therefore, submit that the imposed rejection of claims 1, 4 and 6 under 35 U.S.C. §103 for obviousness predicated upon Chen is not factually or legally viable and, hence, solicit withdrawal thereof.

Claim 2 was rejected under 35 U.S.C. §103 for obviousness predicated upon Chen in view of Nguyen.

Claim 7 was rejected under 35 U.S.C. §103 for obviousness predicated upon Chen in view of Hause et al.

Each of the above rejections of claims 2 and 7 under 35 U.S.C. §103 for obviousness is traversed. Specifically, claims 2 and 7 depend from independent claim 1. Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 1 under 35 U.S.C. §103 for obviousness predicated upon Chen. Specifically, Chen neither discloses nor suggests a semiconductor device

comprising, *inter alia*, a surface insulating film extending into a trench isolation and being sufficiently thin to function as a fuse. Again, Chen does not even disclose a fuse, and there is no basis upon which to predicate the determination that any insulating film disclosed Chen is **necessarily** thin enough to function as a fuse, noting that inherency requires certainty not speculation. . *Finnegan Corp. v. ITC, supra*; *In re Robertson, supra*; *Ex parte Schriker, supra*. The additional references to Nguyen and Hause et al. do not cure the argued deficiencies of Chen.

Further, Applicants would separately argue the patentability of **claim 2**. In this respect Applicants again note that Nguyen clearly distinguishes between antifuses and fuses. In fact, Nguyen teaches away from fuses because of the large amount of debris and circuit contaminants arising when they are blown and that they have an undesirable characteristic of regrowth with time (ultimate full paragraph in column 1 on Nguyen). Such a clear teaching away from the claimed invention underscores the **nonobviousness** of the claimed invention as a whole. *In re Bell*, 991 F.2d 781, 26 USPQ2d 1529 (Fed. Cir. 1993); *Specialty Composites v. Cabot Corp.*, 845 F.2d 981, 6 USPQ2d 1601 (Fed. Cir. 1988); *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986); *W. L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983).

~~Further, Applicants would separately argue the patentability of **claim 7**.~~ The Examiner relies upon Hause et al. for the concept of putting insulation into a trench. The only problem is that Chen does not disclose an isolation region but a protection cell. Accordingly, the Examiner has not made a "thorough and searching" factual finding and, based upon such facts, explain **why** one having ordinary skill in the art would have been motivated to modify the particular semiconductor device disclosed by Chen to arrive at

the claimed invention in view of the unrelated teachings of Hause et al. *In re Lee* ___F.3d___, 61 USPQ2d 1430, 1433 (Fed. Cir. 2002).

Applicants, therefore, submit that the imposed rejection of claim 2 under 35 U.S.C. §103 for obviousness predicated upon Chen in view Nguyen, and the imposed rejection of claim 7 under 35 U.S.C. §103 for obviousness predicated upon Chen in view of Hause et al. are not factually or legally viable and, hence, solicit withdrawal thereof.

It should, therefore, be apparent that the imposed objection and rejections have been overcome and that all pending claims are in condition for immediate allowance. Favorable consideration is, therefore, respectfully solicited.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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IN THE CLAIMS

Claims 2 and 3 now read as follows:

2. (Twice Amended) The semiconductor device according to claim 1,
further comprising:
a plurality of surface insulating films formed on a surface of the active regions in
the first portion and on the interior surface of said at least one trench in the second
portion; and
a plurality of conductive films formed on each of the surface insulating films in
the first portion;
wherein one of the surface insulating films is formed on the interior surface of
said at least one trench in the second portion and is capable of functioning as an electric
fuse.

3. (Twice Amended) The semiconductor device according to claim 2,
wherein:
the plurality of surface insulating films are gate oxide films; and
the plurality of conductive films are gate electrodes.